

What is claimed is:

1. A heat exchanger comprising:

a plurality of tubes through which refrigerants flow, the
5 tubes being spaced away from each other; and

a plurality of fins through which the tubes are
perpendicularly inserted, the fins being spaced away from each
other at a predetermined distance, each of the fin having more
than four peak portions and more than four valley portions that
10 are alternately disposed, heights or depths of at least two peak
portions or at least two valley portions being different from
each other.

2. The heat exchanger according to claim 1, wherein the
15 fin is a corrugate fin having an inversed W-shape.

3. The heat exchanger according to claim 1, wherein
heights from a horizontal plane, where one of the valley portions
is located, to the peak portions are different from each other.

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4. The heat exchanger according to claim 1, wherein depths
from a horizontal plane, where one of the peak portions is
located, to the valley portions are different from each other.

5. The heat exchanger according to claim 1, wherein the valley portions are located on a horizontal plane, and heights from the horizontal plane to the peak portions are different from each other.

6. The heat exchanger according to claim 5, wherein among the peak portions, the outer peak portions have a first height and the inner peak portions have a second height, the first height being different from the second height.

7. The heat exchanger according to claim 1, wherein the peak portions are located on a horizontal plane, and depths from the horizontal plane to the valley portions are different from each other.

8. The heat exchanger according to claim 7, wherein among the valley portions, the outer valley portions have a first depth and the inner valley portions have a second depth, the first depth being different from the second depth.

9. The heat exchanger according to claim 1, wherein a longitudinal centerline of the pin is defined by one of the

valley portions, the pin having left and right halves that are symmetrical based on the longitudinal centerline, the heights and depths of the peak and valley portions being increased as they go to an outer side.

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10. The heat exchanger according to claim 6, wherein the first height is greater than the second height.

11. The heat exchanger according to claim 1, wherein each
10 of the fins comprises:

a plurality of fin collars disposed along a longitudinal centerline of the fin, each of the fin collar being elevated to a predetermined height to define a tube insertion hole through which the tube is inserted;

15 a plurality of seats each disposed on a lower end of an outer circumference of the fin collar; and

an airflow guide portion formed extending from an outer circumference of the seat to the peak portions at a predetermined angle to allow air to flow along an outer circumference of the
20 tube.

12. The heat exchanger according claim 11, wherein the seats are located on a horizontal plane identical to that where

the valley portions are located, the seat having a predetermined width.

13. A heat exchanger comprising:

5 a plurality of tubes through which refrigerants flow, the tubes being spaced away from each other; and

a plurality of fins spaced away from each other at a predetermined distance, each of the fin including a fin collar through which tube is perpendicularly inserted, a seat disposed
10 around an outer circumference of the fin collar, and peak and valley portions alternately disposed, inclined angles of portions connecting the peaks with the valleys being different from each other.

15 14. The heat exchanger according to claim 13, further comprising an airflow guide portion formed extending from an outer circumference of the seat to the peak portions at a predetermined angle to prevent air from getting out of a circumference of the tube.

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15. A heat exchanger comprising:

a plurality of tubes through which refrigerants flow, the tubes being spaced away from each other; and

a plurality of fins spaced away from each other at a predetermined distance, each of the fin including a fin collar through which tube is perpendicularly inserted, a seat disposed around an outer circumference of the fin collar, and peak and valley portions alternately disposed, at least one of the valley portions being formed between the peak portions in a flat shape having a predetermined width.

16. The heat exchanger according to claim 15, wherein the valley portion formed in the flat shape is located on a horizontal plane identical to that where the rest of the valleys are located.

17. The heat exchanger according to claim 15, wherein the valley portion formed in the flat shape is located on a horizontal plane higher than that where the rest of the valleys are located.

18. The heat exchanger according to claim 15, wherein the valley portion formed in the flat shape is located on a horizontal plane identical to that where the seat disposed around the fin collar is located.

19. The heat exchanger according to claim 15, wherein a width W_o of the valley portion formed in the flat shape is determined such that the following condition is satisfied,

5 $1.0 > W_o/D > 0.3$

where, the D is an outer diameter of the fin collar.

20. A heat exchanger comprising:

10 a plurality of tubes through which refrigerants flow, the tubes being spaced away from each other; and

 a plurality of fins spaced away from each other at a predetermined distance, each of the fin including a fin collar through which tube is perpendicularly inserted, a seat disposed
15 around an outer circumference of the fin collar, peak and valley portions alternately disposed, inclined portions extending from an outer circumference of the seat to the peak portions.

21. The heat exchanger according to claim 20, wherein the
20 seat is located on a horizontal plane lower than that where the valley portions are located.

22. A heat exchanger comprising:

a plurality of tubes through which refrigerants flow, the tubes being spaced away from each other; and

a plurality of fins each having fin collars through which the tubes are perpendicularly inserted and peak and valley portions that are alternately disposed, heights and depths of the outer peak and valley portions being different from those of the inner peak and valley portions.

23. The heat exchanger according to claim 22, wherein the adjacent tubes are inserted into the fin collars in a zigzag shape.

24. The heat exchanger according to claim 22, wherein a ratio of the depths of the valley portions to the heights of the peak portions is equal to or less than 0.7.